The American FERTILIZER

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Conservation and Public Policy*

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A spectre haunts the world today. It is a spectre of world-wide hunger.

It haunts the council chambers of the United Nations, where every deliberation is to some extent conditioned by it. It haunted the corridors of the Normal School in Mexico City, where I worked, all through November with the representatives of 38 nations on the 1948 program for UNESCO. We were struggling to achieve UNESCO's aim of peace through understanding—a peace derived from collaboration among nations in science, education, and culture. But how, we were forced to ask ourselves—how can such collaboration be achieved in a hungry world? In such a world, people are unable to think about, much less work toward, those goals of truth, justice, and human dignity upon which any permanent peace depends. They can think only of food. The whole of their energy is focused upon the elemental necessities of survival.

And what if this hunger, this misery of famine, becomes a permanent condition of the bulk of mankind?

We are accustomed to dismiss this possibility as an exploded superstition made popular by Malthus in the early 19th Century. We are accustomed to thinking of the world food crisis as a temporary crisis, an aftermath of war whose rigors will be alleviated as the effects of war are erased. And to some extent this is true. The restoration of the world's agricultural economy to the state it was in before the war would be, certainly, an immense improvement over our present situation.

But—and this is highly significant—such a restoration would not dismiss hunger from the world, nor would it insure us against a future food crisis worse than the one we are now in. It is well to remember that there has never been a real surplus of food in the world; always there have been millions who were poorly nourished, sometimes even starving, but who had no way of making their needs felt in market terms. Before the war, two-thirds of all the people in the world were undernourished, and half of the world's population suffered disease, misery, and premature death from a lack of the right kinds of food.

If we had at this moment a feasible 25-year-plan to bring the diet of people everywhere up to about 2,600 calories per person per day (a very meager diet by your standards and mine)—if we had such a plan, I say, *it would involve increasing present world food production by 110 per cent,* taking into account the estimated increase in population. And I say in all earnestness that it is an open question whether food production, for all our science, can be increased that much.

*An address to Second Annual Midwest Farm, Home and Industrial Conference, Topeka, Kans., December 15, 1947.

Certainly it can never be if we fail to consider one overwhelmingly important factor—namely, the factor of *soil depletion and soil erosion.*

Only 11 per cent of the world's land can be used for food production—and more than two billion human beings are dependent for subsistence upon that 11 per cent, or four billion acres. This means that, for each human being, there are only two acres from which food can be obtained—two for you, and two for me. Not all of the four billion acres are highly productive. Millions of them are poor indeed. And they are becoming poorer. Erosion, stripping away the precious topsoil, gouging gullies into slopes, is actually destroying millions of good acres every year and lowering the productive capacities of many millions more. Deserts, as Paul Sears once wrote, are on the march!

U. S. Short on Farm Acreage

Of course we have more than two productive acres for each person in the United States, but not as much more as many people seem to think. We now have approximately 451 million acres of cropland in the United States, or a little more than three acres per person. In normal times, an American family with a $2,000 income needs three acres per person to maintain its standard of living—two and one-half acres for food and one-half acre for shelter, clothing, and the raw materials of industry. It happens, however, that of the 451 million acres now in crops, some 61 million are unsuited to crop production. If these acres were shifted to other uses, as they should be, we would have available for immediate production only 390 million acres, and this is considerably less than three acres per person.

There are, of course, potential croplands which have not yet been put to crop use. If every acre suitable to crop production were put to that use, we'd have 466 million acres in crops, or three and one-fifth acres per person. This would give us a safety margin of one-fifth acre per person. But even if these acres were maintained at their present capacity for production, the narrow margin of safety would have disappeared by about 1960, due to population increases. By 1970, at the present rate of population increase, we would have only two and eight-tenths acres per person or one-fifth of an acre less than the required three acres.

It is in the light of these facts that we must consider the problem of soil and fertility losses. In the United States we have an erosion rate which is probably faster than that of any other region in the world, save South Africa. The amount and rapidity of our soil wastage is terrifying. Some 50 million acres formerly in production have been essentially ruined in the brief period of our national existence. An additional 50 million acres have been so severely damaged as to be marginal or submarginal. Still another 100 million acres have lost half their topsoil—and an additional 100 million acres are losing topsoil rapidly. In such young farming areas as Kansas, Nebraska, and Oklahoma, a fourth of the cultivated land has been essentially ruined and more than that has been severely damaged—the result of intensive farming in the last sixty years.

Every year the Mississippi pours three-quarters of a billion tons of soil into the Gulf of Mexico. From farm lands alone the annual soil loss in the United States is enough to fill a train of freight cars girdling the earth at the equator eighteen times!

Truly this is a headlong plunge toward disaster. For all practical purposes, topsoil is irreplaceable. Under the best conditions of vegetative cover, it takes nature several hundred years to build an inch of topsoil—and the average thickness of topsoil on virgin land was barely seven inches. In a very real sense, we of the United States were only seven inches from destitution to begin with. We are closer than that now . . .

Our Conservation Policy

It is in the light of these facts that we of the United States must shape our policies with regard to conservation.

Heretofore, our attempts at solving this problem have been of two kinds. In the first of these we began with the physical problem itself; we analyzed it into its physical components—fertility losses, runoff, erosion debris, and so on.

We then devised a physical solution for the physical problem; it consisted of combinations of terraces, contour plowing, better rotations, improved use of fertilizers, increased vegetative cover, and so on. This physical solution required social action, so we devised social instruments through which the physical solution might be applied within the framework of our democratic traditions.

Our second attempt at a solution was very different. We went at the problem the other way 'round. Here we began with a social problem and proceeded to what we believed (or pretended) were its physical implications. We attacked the soil problem in terms

of prices and income. The results were hideously unsatisfactory. I dislike saying it, but I think it is true that in the first situation we were honest with ourselves; in the second situation we were not.

It was the U. S. Soil Conservation Service, under the evangelical leadership of Hugh H. Bennett, which began with soil conservation as a physical problem. Early in the 1930's it launched a program which, despite all its initial mistakes, was a major contribution to the permanent agricultural life of America. It was an integrated farm program for wise land use, and it employed not one but all of the control devices needed to solve the conservation problem on each individual farm, and in each small watershed. Conservation workers analyzed the soil, slope, and other factors of each farm before suggesting a combination of practices to yield conservation, just as the physician makes a diagnosis before prescribing remedies. Soon, specialists began taking into account the farmer's financial problems and the farm-management implications of the physical changes required in farming methods for the achievement of maximum conservation. Soon, too, it was found that an integrated program not only reduced soil and fertility losses to negligible proportions, but that it resulted in *increased financial profit for the farm operator.* And, finally, experience showed that almost any farm operator could, with some technical help, develop a practical land use plan for his own farm, install all the elements of that plan, and begin making greater returns—all within a period not to *exceed five years.*

I shall return to this last point in a moment.

Flood and Erosion Control

Next came two tremendously important developments. First, Congress authorized watershed flood-control surveys which, as they progressed, showed that conservation on a vast scale was not only possible, but also that the total returns to landowners and society would far exceed the cost, if both costs and benefits were projected on a fifty-year basis as is done in determining the feasibility of flood control structures in streams. Second, came the soil conservation district—a subdivision of State government brought into being through a democratic referendum of landowners and operators. By November 15, 1947, there were some 2,000 districts in the United States. They encompass more than one billion acres and approximately four million farms. However, only a fraction of the one billion acres—less than 10 per cent, in fact—is covered by conservation practices.

Now, I have said that it was found that conservation practices pay the farmer in dollars and cents. Why is it, then, that we have made so little progress toward good land use during the past decade despite the fact that we have spent billions of dollars for that avowed purpose? Why, with all the technical knowledge now available, have not these billions brought us conservation on a truly vast scale?

The answer can be found, I think, in a consideration of our second major effort in this field. It began with economic policy and later merged with physical soil conservation as a matter of expediency—a process not wholly free of hypocrisy.

Farm Economic Relief

The Agricultural Adjustment Administration came into existence in desperate days, and it went to work with enormous zeal on the theory that production control, accompanied by cash payments to farmers, could help increase farm prices and income. As a result of an unfavorable Supreme Court decision, the Congress fashioned what it called the Agricultural Conservation Program, but the major purpose was still price and income stabilization. The stated theory was that by reducing the acreage of soil-depleting crops and increasing that of soil-conserving crops we would achieve both production control and conservation.

The marriage of economic policy and physical soil conservation was an unhappy one: The two parties turned out to be incompatible—perhaps because there was some doubt as to the legitimacy of the marriage ceremony. Those who developed the law were not at that time primarily concerned with conservation. They were concerned with prices and income. Benefit payments were provided in the guise of subsidies for soil-saving practices, but since the real aim was price support, a certain cynicism about the government's conservation program became inevitable and widespread. In retrospect we can only wish that Congress had found some constitutional and popular vehicle other than conservation for achieving the ends it really had in mind.

In the 1930's, as now, it was clear that the mere expansion of soil-conserving crops, and the haphazard adoption of individual practices would not stop soil and fertility losses. Every technical man in the Department of

Agriculture and the Land Grant Colleges knew that, as did most farmers.

True, some valuable conservation practices have been adopted by farmers under impetus of the Agricultural Conservation program. I would say that we have achieved perhaps ten cents worth of conservation for each dollar spent in the program—though the percentage is probably declining because we continue to pay for the same practices on the same farms year after year.

And we will never get a better return so long as we base payments on individual practices which often bear no relation to the individual farm, for every farm, like a man's face, is distinctly individual, and every farm requires a particular combination of practices based upon a carefully devised plan that takes into account every physical, human, and economic resource of that farm.

So we have had two programs—one primarily physical and technical, and the other primarily economic—and we have called them both conservation programs. This has resulted in enormous confusion in the public mind as to the true nature of and need for soil conservation, and has led to the cynicism I mentioned a moment ago.

I am convinced that there is a coincidence of moral and practical values in public as in private life—that in the long run only that which is moral can be truly practical; and I am equally sure that such subterfuges as that employed in the revised AAA is basically immoral. In a democracy, it is of the greatest importance that public opinion be accurately and clearly informed. Any action by government which confuses the citizen mind as to the nature and purposes of a public program is hostile to democracy. It is even a reversal of the democratic process.

What, then, should our public policy be with regard to conservation?

Price Support Is Not Conservation

In the first place, we must get rid of the subterfuge of making income payments disguised as conservation payments. If, for economic reasons, a farm price support program again becomes necessary, the income payments to farmers should be made frankly and openly as such. I personally hope we can maintain high economic activity in the United States and thus avoid the necessity of what we call a "farm relief" program, for such a program, in a general economic depression, can at best be an insurance policy to stave off economic disaster. Of course, insurance is needed—but that is outside the scope of my discussion today.

Once the subterfuge is done away with, I find that my own general policy recommendations are two: The first of these is that we should greatly expand the amount of public money devoted to obtaining genuine soil conservation. After all, soil and fertility losses are today costing this nation more than 3½ billion dollars a year. The second is that all governmental economic aid to the individual farmer should be conditional upon that farmer's establishment of a conservation program on his farm.

Distribution of Conservation Funds

I would distribute the public funds devoted directly to conservation among four broad types of activity:

The first of these is scientific research aimed toward the further development of land-use practices which conserve soil and its fertility, and toward the development of new techniques which enable the individual farmer to discover and adopt the combination of practices suited to his particular problem.

The second activity has to do with the mapping procedures whereby the data necessary for sound land-use planning is made available. The present mapping techniques employed by Soil Conservation Service technicians are too elaborate and slow to enable us to keep up with a constantly accelerating erosion problem. Present mapping procedures are such that by the time the country is covered by conservation maps, those maps —or most of them—will be out of date. Every farm of the United States should certainly have a simple map showing its soil types and phases, depth of topsoil, slope, degree and rate of erosion, and, from all these, the use to which each parcel of land is best suited. I believe that farmers themselves, with technical guidance, can themselves make maps of their farms sufficiently accurate to enable them to install effective conservation practices. I am certain that a good conservation technician, trained in extension methods, can readily train groups of 25 to 30 farmers in the techniques of mapping their own farms. By extending this device we could cover in one year ground which, by present mapping procedures, would take a dozen years or more and cost a dozen times as much.

The third of the four activities among which public funds should be distributed has to do with technical personnel devoted to helping farmers in the development of sound

(Continued on page 26)

International To Open Noralyn Phosphate Mine in March

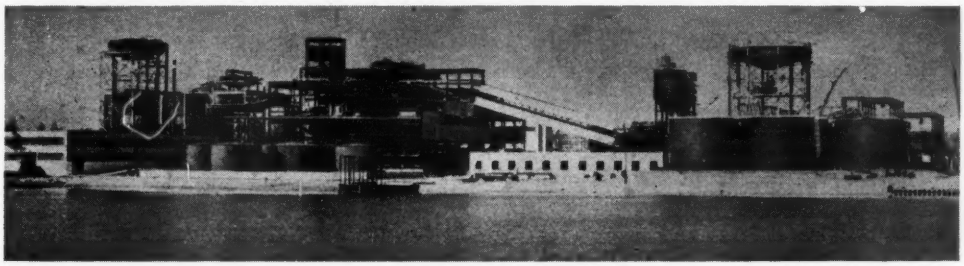
Progress on the new Noralyn phosphate mine and plant, under construction near Bartow, Fla., by International Minerals and Chemical Corporation, now indicates that it will be ready for operation early in March, according to Franklin Farley, vice-president of the corporation's phosphate division, who has returned from an inspection of the huge project.

Output of the new mine is expected to attain a production capacity of 1,500,000 tons of phosphate annually, making it the largest mine of its kind in the western hemisphere, Mr. Farley pointed out. With an annual present production capacity of 2,000,000 tons from its Peace Valley and Achan mines, also near Bartow, completion of the new project will give International Minerals and Chemical Corporation a total annual phosphate production capacity of 3,500,000 tons from its Florida fields. This capacity alone will exceed the annual prewar phosphate output of all companies operating in Florida.

The new Noralyn mine will utilize all the latest advances in the science of phosphate mining and refining, many of which were developed by the corporation's research division. The production of phosphate at Noralyn mine will be accomplished by the familiar strip mining technique used throughout the Florida phosphate fields, utilizing giant dragline excavators to remove the surface soil and tap the extensive sub-surface ore beds that represent the richest deposits of that mineral in this country. The Noralyn mine constitutes one of the richest phosphate beds thus far discovered and it is predicted that it will be in production at least 25 years before exhaustion.

Although the new mine will be in actual operation in about one month, its output will be transported initially for drying and shipping from other nearby company facilities now in operation until construction of its own drier is completed later this year. As soon as the additional drier equipment is ready, International Minerals and Chemical Corporation will have a total phosphate production capacity three times its prewar output rate.

The heavy investments by the corporation in its Florida phosphate operations were made in recognition of the growing demands for the phosphate component in fertilizers and industrial chemicals, both by domestic agriculture and industry, as well as the needs of foreign markets in the devastated European and Western Pacific areas.



The plant for the new Noralyn mine of International Minerals and Chemical Corporation nearing completion near Bartow, Florida

Netherlands Expanding Nitrogen Production

According to plans for expansion of production, the Netherlands will become an exporter, rather than an importer, of fertilizer nitrogen. The Dutch nitrogen requirements are at present about 150,000 tons per year.

The Merkof Nitrogen Company, Ymuiden, has already reached the prewar level of output of 90,000 tons of nitrogen per year and expects within a few years to increase this to 175,000 tons. Equipment for the expansion program has already been ordered in the United States and Great Britain. The company is an associate of a blast furnace and steel works.

The nitrogen subsidiary of the State coal mines is spending 35 million guilders to increase production at their Lutterade plant. Eventually they expect to manufacture 300 tons of nitrogen daily.

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Principal Articles in This Issue

Sulphate of Ammonia for 1947 Sets Record

A production of 74,480 tons of by-product sulphate of ammonia during December, the highest monthly figure on record, brought the total 1947 output to 820,520 tons, an increase of 27.5 per cent over 1946 and the best yearly production to date. This was made possible by a steady production of over 2,000 tons per day throughout the year, without the crippling effect of strikes in coal, steel and railroads which has reduced previous years' figures. Shipments during 1947 were 818,993 tons, compared with 642,236 tons in 1946. At the end of the year 1947, stocks on hand amounted to only 28,753 tons.

By-product ammonia liquor increased about 3 per cent during 1947, with a total production of 25,715 tons NH_3. Shipments totaled 23,619 tons during the year.

During the year, 64 coke plants were producing sulphate of ammonia and 19 plants produced ammonia liquor.

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH_3
Production:		
December, 1947	74,480	2,219
November, 1947	71,998	2,098
December, 1946	57,116	2,214
Jan.–Dec., 1947	820,520	25,715
Jan.–Dec., 1946	643,752	24,991
Shipments		
December, 1947	76,609	1,942
November, 1947	69,877	1,913
December, 1946	59,017	2,224
Stocks on Hand		
December 31, 1947	28,753	911
November 30, 1947	32,241	793
December 31, 1946	33,411	645

PRODUCTION BY MONTHS

1947	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH_3
1947		
January	68,045	2,164
February	61,298	1,986
March	67,677	2,266
April	65,000	2,164
May	67,649	2,229
June	66,168	2,070
July	66,018	2,192
Auguest	70,147	2,103
September	68,340	2,036
October	73,700	2,188
November	71,998	2,098
December	74,480	2,219
Jan.—Dec., 1947	820,520	25,715
Jan.—Dec., 1946	643,752	24,991
Jan.—Dec., 1945	764,293	27,607

Lockwood Predicts Better Fertilizer Balance

The fertilizer industry will produce more nitrogen and potash for use as fertilizer to appropriately balance increased phosphate capacity indicated in a recent survey of the industry.

This forecast was made at the New England fertilizer conference at Amherst, Mass., by Maurice H. Lockwood, president of The National Fertilizer Association in discussing current problems of the fertilizer industry before a group of 100 industry representatives.

In the 24-year period from 1920–1944 the ratio of phosphoric acid to nitrogen and to potash changed from a 3:1 to a 2:1 basis, Mr. Lockwood said. With phosphate capacity reaching a new all-time record quantity of more than 2½ million tons of phosphoric acid by 1949 and with nitrogen and potash currently used as fertilizer in amounts of from 800 to 900 thousand tons each, he stated that the United States may appear to be returning to its 1920 ratio. Inasmuch as the trend has been definitely toward narrowing the ratio of phosphoric acid to nitrogen and to potash, N. F. A.'s President predicted that just as the phosphate segment of the industry has stepped up its production and capacity markedly, so too would the nitrogen and potash segments of the industry continue to raise their production and capacity. In this way the long-time trend can continue toward more nitrogen and potash in relation to phosphoric acid.

Thus industry with its checks and balances of competition and its customary practice of filling definite needs will progressively correct the narrowing disparity between supply and demand. Mr. Lockwood pointed out that some units in the industry are already taking such steps in both potash and nitrogen operations.

Sweet Potato Goals for 1948 Announced

The U. S. Department of Agriculture has recommended to U. S. D. A. State Councils a 1948 sweet potato goal of 617,500 acres, which is the same as the total acreage planted in 1947. With average yields this acreage would result in a crop about equal to the 57,178,000 bushels produced in 1947.

The recommendation included some suggested adjustments in the acreage among potato producing states. These suggested adjustments were made after considering the varieties grown, and the handling and marketing prcatices in the various states.

Difficulties experienced in recent years in marketing of sweet potatoes are related to the production of certain varieties in excess of the demands for these varieties, and to the practice in some states of marketing a large proportion of their production during the harvesting season rather than the use of storage facilities to extend the season over several months.

The goals for individual states will be announced by the State U. S. D. A. Councils after consideration of the Department's recommendations and after suggestions from the councils are approved by the Department.

December Superphosphate Sets Record

Production of superphosphates of all kinds during December, 1947, figured on the basis of 18% A.P.A. reached the record total of 962,251 tons, an all-time record for one month, according to the figures of the U. S. Bureau of Census. This output was 10 per cent above that of November, 1947, and 23 per cent higher than December, 1946. As new production facilities come into operation, it is expected that the million-ton-a-month will soon be a reality.

Most of the gain was registered in normal superphosphate with a record yield of 871,018 tons. Concentrated superphosphate also increased to 34,062 tons, being exceeded only by the months of April, 1947 and October, 1947.

Due to car shortages, shipments were somewhat lower than production, with a corresponding increase in stocks on hand at the end of the year.

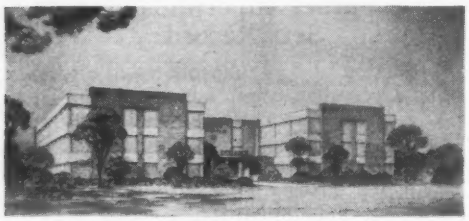
	Normal 18% APA	Concentrated 45% APA	Base Goods 18% APA
Production	Tons	Tons	Tons
Dec. 1947.....	871,018	34,062	6,078
Nov. 1947.....	793,109	29,892	5,603
Dec. 1946.....	709,122	28,134	3,818
Shipments and Used in Producing Plants			
Dec. 1947.....	802,242	29,568	5,448
Nov. 1947.....	725,958	31,485	3,333
Dec. 1946.....	664,252	29,588	2,047
Stocks on Hand			
Dec. 31, 1947....	861,209	66,134	18,235
Nov. 30, 1947....	772,457	61,640	17,495
Dec. 31, 1946....	646,278	54,713	13,616

Commercial Solvents To Spend $2,000,000 for Research Expansion

Henry E. Perry, President of Commercial Solvents, Corporation, has announced plans for an extensive expansion of the Research and Development Department at Terre Haute, Ind. Two million dollars will be spent for new buildings and equipment. Plans have been approved and construction will begin shortly.

The program calls for more than doubling the size of the present research building, construction of a new bacteriological pilot plant unit, a separate building for a high-pressure research pilot plant, and an addition to the pharmacological laboratory.

Kenneth H. Hoover, Vice-President in Charge of Research and Development, estimates that the staff will be increased by the



Drawing of Main Research Building of Commercial Solvents Corporation in Terre Haute, Ind. Three additional buildings in the rear will house laboratories and pilot plants

addition of approximately 150 chemists, bacteriologists, chemical engineers, patent attorneys, administrative assistants, pilot plant operators, laboratory assistants and clerical personnel.

The program is part of a long range plan conceived to provide adequate research facilities in proportion to the expended activities of Commercial Solvents. It is designed to implement the functions of the Research and Development Department which are to conceive and receive ideas for new products, develop processes for improving the quality and lowering costs of existing products, as well as to find new uses for old products.

Projects of the Research Department will include the development of new insecticides, the formulation of consumer goods, the broadening of the uses for standard chemical products in a variety of industries, and studies of processes for the manufacture of numerous chemicals derived from methanol and ammonia.

In addition to its own research staff, headed by Vice-President Hoover; Thomas S. Carswell, Manager, Research and Development Department; Dr. Jerome Martin, Director of Research; Dr. Paul W. Bachman, Manager, Technical Development Division; and Frank M. Crawford, Patent Division, Commercial Solvents has a Research Advisory Council composed of outside consultants. These include Carl S. Miner, Director of the Miner Laboratories in Chicago, and Dr. C. S. Miner, Jr., Associate Director; R. Norris Shreve, Head of the Department of Chemical Engineering, and H. B. Hass, Head of the Chemistry Department, of Purdue University; Dr. W. C. O'Kane, Head of the Crop Protection Institute at Durham, N. H.; C. D. Hurd, of the Chemistry Department of Northwestern University; W. C. Fernelius, Department of Chemistry at Syracuse University; Dr. A. C. Ivy, Vice-President of the University of Illinois School of Medicine; Dr. David R. Goddard, Professor of Botany at the University of Pennsylvania; and Walton Marshall and J. W. Moorman of the Marshall-Moorman Development Company in New York City.

FERTILIZER MATERIALS MARKET

NEW YORK

Drop in Grain and Meat Prices Affects Prices on Organic Materials. Prices Still Above Fertilizer Range. One Potash Producer Increases Price. Possible Coal Strike Threatens Sulphate of Ammonia Supply. Shipments of Mixed Fertilizer to Farmers Slower Than Usual.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, February 18, 1948.

The heavy winter has made the movement of fertilizer to the farm very backward and manufacturers along the Atlantic seaboard are having difficulty in getting farmers to take fertilizer.

Organics

The drastic decline in the grain market has had its effect in the price of fertilizer materials that are also used by the feed trade such as tankage and blood. As feed buyers withdrew from the market, meat packers took any available bids with the result that sales of tankage were made at $9.00 per unit of ammonia ($10.94 per unit N), and even lower prices were mentioned. Blood sold at $9.00 as against $12.00 ($14.59 per unit N), about two weeks ago. The vegetable meal markets were very much upset with many re-sale lots coming on the market to upset the prices. It is hard to quote the actual market but sales of cottonseed meal, soybean meal and linseed meal were made at about $30.00 per ton under the prices prevailing several weeks ago. Buyers are still holding off.

Fish Meal

This market held firmer than some of the other feed materials because there has been a very small carryover from the fishing season and the demand is still fairly good from the feed trade. Quotations were shaded slightly but no big drops were reported.

Castor Pomace

This material was reported in a little better supply as some buyers were forced to postpone shipments due to bad weather.

Sulphate of Ammonia

Should a coal strike be called for March 1st, this would drastically affect the production of this material and manufacturers are hoping it will be postponed until they can get their spring requirements into their plants. Demand is heavy from all sections.

Nitrogenous Material

One producer who had been quoting a higher price reduced his spot price to $5.00 per unit of ammonia ($6.08 per unit N), f.o.b. shipping point. Other producers maintained their present schedules.

Nitrate of Soda

A large demand is looked for in the late spring for top dressing and most buyers feel the supply will be short of their requirements.

Hoof Meal

Slightly lower prices were heard on this material but the available supply is very small. This material declined in sympathy with other materials such as tankage and blood which are still too high for most of the fertilizer trade.

Ammonium Nitrate

Buyers seemed to be having great difficulty in obtaining shipments of this material, due to production difficulties. The demand was very heavy.

Nitrogen Solutions

Many buyers report they are short, due to some cutbacks by the producers.

Superphosphate

Producers were busy shipping on old contracts and report shipments going forward in a satisfactory manner. Shortages were still reported at midwestern points.

Potash

While potash producers are making every effort to keep shipments moving, buyers are still short of their requirements. One producer raised the price of muriate of potash about three cents per unit, effective at once. Other producers have indicated they would hold to their present schedule.

CHARLESTON

Material Shipments Improve but Demand Still Tops Supply. Organic Prices Drop. Rock Production Increasing.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, February 16, 1948.

Contract buyers are getting practically normal shipment of potash, but demand continues excessive. Nitrogen continues in just as tight or tighter supply than potash, with superphosphate also tight but more available than the two other prime ingredients.

Organics.—Demand is rather slack with the supply situation considerably eased. Prices are lower than previously quoted this year, particularly on domestic nitrogenous which can be obtained at $5.00 to $5.25 per unit of ammonia ($6.08 to $6.38 per unit N), f.o.b. production points. South American prices continue higher than domestic buyers' views.

Castor Pomace.—No new offerings are reported and demand is not too great.

Potash.—Producers of potash are practically back on schedule but demand continues greater than supply.

Nitrate of Soda.—No easement in the tight market conditions on nitrate of soda is noted. Demand for both domestic and imported nitrate of soda continues in excess of supplies. No price changes have been reported.

Sulphate of Ammonia.—Price on coke-oven material is around $38.00 to $40.00 per ton in bulk, f.o.b. works, with the demand greatly in excess of available supply.

Dried Ground Blood.—The market has weakened recently due to slackening in the feed trade and latest price quotations are around $10.00 to $10.50 per unit of ammonia ($12.15 to $12.76 per unit N), f.o.b. production points in the east and in the midwest.

Tankage.—Prices are lower due to decrease in demand from the feed market. Prices are around $10.00 to $10.50 per unit of ammonia ($12.15 to $12.76 per unit N), f.o.b. midwestern and eastern production points.

Superphosphate.—Stocks are a little easier in the Southeast due to the delayed call for fertilizers by the farmers on account of bad weather conditions in the South, but these stocks are expected to be diminished quickly when the movement of mixed goods to the country increases.

Phosphate Rock.—The market continues tight as producers endeavor to push production to meet the call from all buyers. Producers are heavily sold up and many buyers complain of inability to get all the rock they wish.

PHILADELPHIA

Demand Still Strong for Materials but Shipment of Mixed Fertilizers Lags. Organics Priced Lower. More Phosphate Rock Expected Soon.

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, February 16, 1948.

Strong demand continues for practically all fertilizer materials. Organics are easier but still too high for general fertilizer use. Delay by farmers in taking delivery of their fertilizer is causing great inconvenience to the mixers.

Sulphate of Ammonia.—Production is still unable to meet current requirements, and demand is very active for resale material.

Nitrate of Soda.—The market remains in the same tight position with demand ahead of supply. Imports continue per schedule.

Ammonium Nitrate.—Supply and production continue inadequate. It is reported that Canada is re-imposing ceilings on this article.

Castor Pomace—No recent offerings are reported.

Blood, Tankage, Bone.—In sympathy with the current general decline of commodity markets, blood and tankage are much easier and demand rather weak. Bone meal is reported more plentiful than a month or two ago. Steamed meal has sold at $50.00 to $53.00 per ton.

Fish Scrap.—Supply is exceedingly scant, although some menhaden meal was offered at the equivalent of $168.00 per ton for 60 per cent protein.

Phosphate Rock.—Domestic demand continues strong and the supply is insufficient. However, it is expected that production will be materially increased during the coming few months.

Superphosphate.—While most movement is on contracts, the supply position is considerably easier.

Potash.—Demand continues in excess of production and supply. Imports are arriving according to schedule, but this material is all under contract.

V-C Purchases Protein Fiber Plant

A. Lynn Ivey, president of Virginia-Carolina Chemical Corporation, has announced the purchase of a new plant at Taftville, Conn., for the production of regenerated protein fibers.

The plant is presently owned and operated by a wholly owned subsidiary of the National Dairy Products Corporation.

Virginia-Carolina Chemical Corporation has engaged in vegetable protein fiber research for many years and has operated a pilot plant at its Carteret, N. J., Research Laboratory. During the earlier stages of this research program, the company maintained contact with the several regional research laboratories of the United States Department of Agriculture, particularly with the Northern Regional Research Laboratories at Peoria, Ill.

According to W. P. ter Horst, General Manager of the Fiber Division of the company, the protein staple fiber developed as a result of this research is believed to be the first of its kind to be produced commercially. The product will be sold under the trade name "Vicara" in varying deniers and staple lengths.

Court Decides Fertilizer Production Is Not Agriculture

A decision of the U. S. Circuit Court of Appeals, First Circuit, in the case of McComb vs. Super-A Fertilizer Works, of Puerto Rico holds that workers engaged in the mixing of fertilizer, bagging it and delivering it to trucks were engaged in the production of goods for commerce, and therefore come under the Fair Labor Standards Act. The company had claimed that the employees were engaged in agriculture and were therefore exempt from the provisions of the Act.

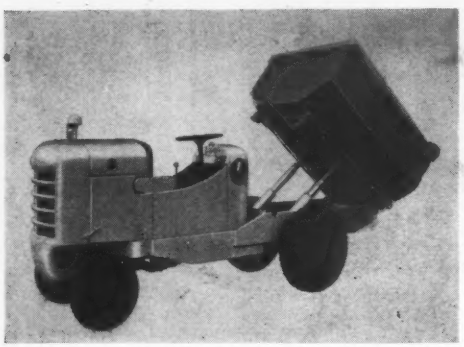
The Court also overruled the company's contention that the fertilizer could not be considered "goods" within the definition of the Act, which excludes goods after their delivery into the hands of the ultimate consumer, saying:

"But whether the farmer is the ultimate consumer of the fertilizer is not relevant here, because if for no other reason the goods for commerce here in-

volved is the sugar, and the defendant's employees are covered by the Act because they are performing work necessary to the production of sugar for commerce."

Hough Announces Payloader Buggy

The Frank G. Hough Company, Libertyville, Illinois, announces a new addition to its line of material-handling equipment, the "Payloader Buggy." It is a gasoline engine powered four-wheel, pneumatic-tire hauling unit with a two cubic yard capacity, hydraulically-dumped body and is designed to provide low-cost, high-production movement of bulk materials in and around plants and yards



Hough Payloader Buggy

over longer hauls than are practical with any type of tractor shovel or loader. Built as a companion to the famous Payloader Shovel, the Payloader Buggy matches it in capacity, compact size, speeds and operation. In addition all main parts of this Buggy are interchangeable with those of the Model HA Payloader Shovel—an important service-economy feature for installations where both Shovel and Buggy are applicable.

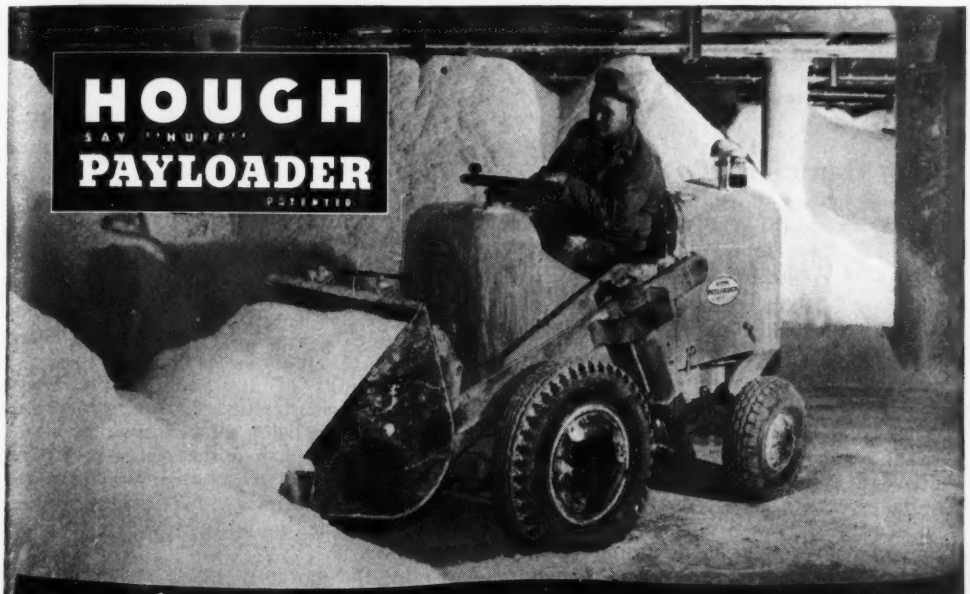
The Payloader Buggy is built low and compact with a short wheel base and rear wheel steer so it can operate in congested low head-room areas and through narrow doorways and aisles. Overall height is only five feet eight inches. Large easy-rolling wheels with ground-gripping pneumatic tires permit operation on paved or unpaved surfaces; hydraulic brakes plus full visibility in every direction allow high travel speeds with complete safety.

The two cubic yard steel body is long, low and wide to facilitate loading by Payloaders, cranes, tractor shovels or by hand. Hydraulic power easily dumps loads exactly where desired—carries fertilizer, sand, slag, coal, cinders, concrete or any other bulk material. A selection of two forward and two reverse speeds are provided for continuous high output. Literature on this new development is available from the manufacturer, The Frank G. Hough Company, 704 Sunnyside Avenue, Libertyville, Illinois.

Price on Trona Muriate of Potash Advanced

The American Potash & Chemical Corporation has announced an increase in price on their muriate of potash from 45.5 cents to 48.5 cents per unit K_2O, in bulk, f.o.b. cars at Trona, California. The price increase became effective on February 10th.

This is the first advance in price that the company has made in seven years and was made necessary by the rise in costs of labor,



Cutting Costs from Coast to Coast

SAVE TIME... MONEY... MANHOURS

Hough Payloaders are slashing costs and breaking stubborn material-handling bottlenecks in hundreds of plants across the continent. They are more than paying their way every day in chemical and fertilizer plants — loading and unloading freight cars, charging bins and conveyors, unloading ship's holds — digging, loading, carrying, spreading and dumping all kinds of bulk material.

The Model HA Payloader (10½ cu. ft. bucket) will do the work of 8 to 10 men — handle 25 to 35 tons of chemicals per hour—incorporates a quarter-century of material-handling experience and the know-how gained in building thousands of Tractor Shovels . . . is sold and serviced by reliable Hough distributors, world-wide. Find out how the Model HA or larger Payloaders can reduce operating costs and manpower problems and boost production in your plant. There is no obligation.

CALIFORNIA

Model HL Payloader doing the work formerly requiring six men — saving 36 manhours per day and $1.05 per ton of material handled.

GEORGIA

"Yesterday discharged from cars 99½ tons in 4 hours, 20 minutes (one driver and one trimmer). Average 50/55 feet from car door to point of dump." (Model HA Payloader.)

NEW JERSEY

Model HA Payloader, unloading box cars of phosphoric acid, cut unloading time in half . . . doubled output per hour . . . saved 88 manhours labor per car, reduced equipment investment.

SEND TODAY for bulletins on the Model HA 10½ cu. ft. Payloader, the ¾ yd. Model HF, the 1 yd. Model HL.

THE FRANK G. HOUGH CO.
704 SUNNYSIDE AVE. LIBERTYVILLE, ILL.
TRACTOR SHOVELS SINCE 1920

materials and supplies during the past years. As an example, it is pointed out that the cost of fuel oil (an important item in their manufacturing process) has increased by 165 per cent since June, 1940.

New Hammond Bag Booklet

A new eight-page brochure, "To Serve You Better With Multi-Wall Bags" has been published by the Hammond Bag and Paper Company, of Wellsburg, W. Va.

The new booklet, printed in two colors, graphically illustrates the expanded service facilities made possible by the opening of the new Hammond plant at Pine Bluff, Arkansas. Delivery service is now adequate for all customers east of the Rockies.

An absorbing story of the production of Multi-Wall paper bags is told in pictures. Manufacturers will be interested to note that these sturdy bags are now being used for shipping fertilizer, flour, cement, lime, plaster, rockwool insulation, chemicals, pigments, potatoes and many other products.

Copies of this new and colorful brochure on Multi-Wall bags are available upon request, and may be obtained by writing to the general offices of Hammond Bag and Paper Company at Wellsburg, W. Va.

Southern Agricultural Workers Meet

Some 1500 agricultural leaders from State agricultural colleges, federal agencies and industry met in Washington on February 12th, 13th and 14th for the 45th Annual Convention of the Association of Southern Agricultural Workers.

The main topic of the meeting was "Adjusting Southern Agriculture to Increase Farm Income." This problem was discussed in separate section gatherings, including those on Economics and Rural Sociology; Agricultural Editing; Agricultural Engineering, Soils and Crops; Animal Husbandry; Commissioners of Agriculture; Forestry; Home Economics; Horticulture; Marketing; Phytopathology; Plant Physiology; Poultry and Soil Conservation.

A feature of the gathering was the "open house" given by the National Fertilizer Association in their offices on February 12th. This was attended by several hundred of the convention delegates and was a pleasant diversion from the busy convention schedule.

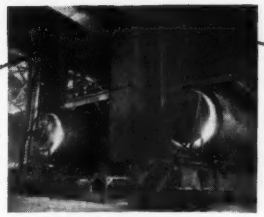
The president of the Association is Dr. M. J. Funchess, Dean and Director of Alabama Polytechnic Institute. Dr. R. F. Poole, President of Clemson Agricultural College, is vice-president and Dr. F. E. Miller, Director of Test Farms, North Carolina Department of Agriculture is secretary-treasurer.

Roll-Back of Canadian Fertilizer Prices Announced

The Canadian Wartime Prices and Trade Board announced on February 18th a roll-back in the price of major fertilizer materials in Eastern Canada. The lower prices, board officials state, are already in effect.

As a result of this action, prices for commonly-used fertilizers, on which no formal ceiling is being set, will average about 8 per cent higher than the prices prevailing in the spring of 1947 despite the increased cost of materials imported from the United States and the discontinuance of fertilizer subsidies.

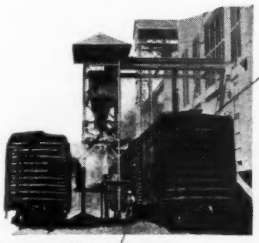
Under the new price regulations, ammonium nitrate will cost Maritime provinces farmers $74.00 per ton, a reduction of $16.50 from the high level established in September, 1947. Prices in Quebec and Ontario are being



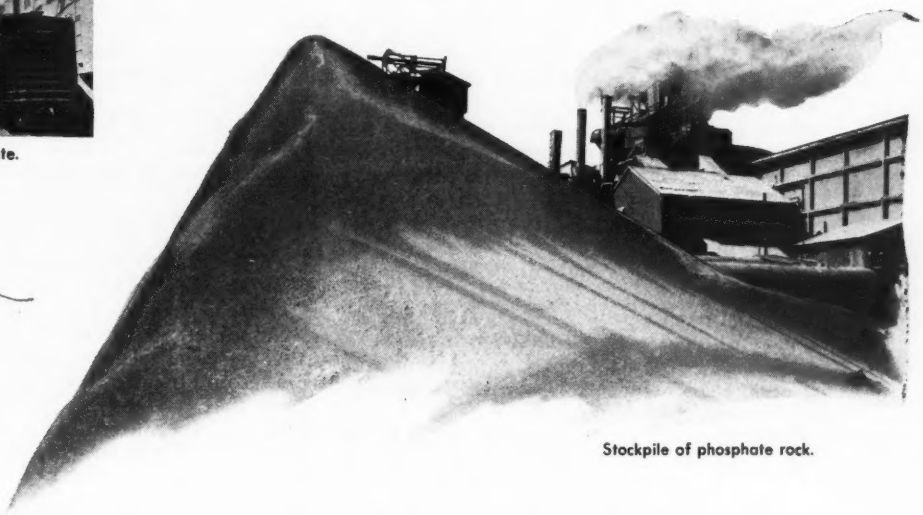
Rotary drying machines.

Phosphate analysis laboratory.

HOW INTERNATIONAL PREPARES LIFE-GIVING PHOSPHATES AT ITS FLORIDA OPERATIONS



Loading boxcars with phosphate.



Stockpile of phosphate rock.

Phosphates are shipped by rail from the washing and recovery operation to the drying and grinding plant; upon arrival, the contents of each car, according to their analysis, are stored in stockpiles of similar grade.

Depending upon specifications, the various grades of phosphate are then blended and transported, via conveyor belts, to the rotary dryers.

After passing through the rotary dryers, the phosphate is conveyed either to the storage bins which feed the grinding mills or to the storage bins for unground phosphate. Both the ground and the unground phosphate is then loaded directly into waiting boxcars.

The final operation is a laboratory analysis of each car. This assures greater accuracy to grade specifications and greater satisfaction to the customer.

PHOSPHATE DIVISION

International

MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

This is the last in a series of 3 pictorial descriptions showing primary operations in the Mining, Recovery and Preparation of International Phosphate Rock for use in industry and agriculture.

reduced by $16.40 and $12.45 per ton respectively. The processor's price of cyanamid is being reduced from $2.15 to $1.80 per unit (20 units per ton) f.o.b., Niagara Falls.

Prevailing prices of other fertilizer materials, on which no formal ceilings are being set, will be slightly above those prevailing a year ago. Superphosphate will cost the consumer 5 per cent more than one year ago; muriate of potash 6 per cent to 8 per cent more, depending on freight charges, and the consumer price for sulfate of ammonia will be about 13 per cent higher.

Machen Joins Lion Chemical Sales Force

Bernard M. Machen, Montgomery, Alabama, has joined the sales staff of the Chemical Division of Lion Oil Company and will represent Lion in Alabama and parts of Tennessee, Mississippi, Georgia and Florida.

Mr. Machen formerly was a sales representative of the Barrett Division, Allied Chemical & Dye Corporation, specializing in nitrate fertilizer sales. The new sales representative is well known in his native State. He is also well versed in matters pertaining to agriculture, having been reared on an Alabama farm. He was educated in Alabama schools and majored in agriculture at Alabama Polytechnic Institute, Auburn.

Mr. and Mrs. Machen and their two sons, James Bernard and Harold Lee, reside in Montgomery, where he will make his headquarters.

The announcement of Machen's appointment to the Chemical Division sales force was made by A. F. Reed, vice-president and general sales manager of Lion Oil Company, El Dorado, Arkansas.

Exploration Increases Potash Reserves

Potash reserves in the Carlsbad district of Eddy County, New Mexico, were increased substantially by Bureau of Mines exploratory work on the United States Potash Reserve, according to James Boyd, director. Although this work was done during the war, a report was not released until late in 1947.

Sixteen vertical core holes drilled from the surface outlined an estimated reserve of 16,017,290 tons of potash ore averaging 24.73 per cent K_2O when using a five-foot minimum thickness and a 15 per cent lower potash limit. Costs of mining and beneficiating this potash also were estimated in this report.

Cost estimates in the report were based on 1944 prices and wages. Costs of equipment and supplies, wages, and even freight rates have since increased largely although prices for the various grades of potash salts have remained the same. Therefore, in releasing the report, the Bureau noted that the estimated costs are not representative of current operations.

A copy of Report of Investigations 4098, "Diamond Drilling of Potash Reserves in Eddy County, N. Mex.," by Walter R. Storms, may be obtained free by writing to the Bureau of Mines, 4800 Forbes Street, Pittsburgh 13, Pa.

The Fertilizer Feud

E. M. Hunt, writing in the *Minnesota Horticulturist* has this to say about organic versus chemical fertilizer: "Judging from the many word battles now being waged by the organic versus chemical gardening advocates, it would seem that the gardening crisis of our generation has reached a point to demand serious attention. To the informed student of soil science the whole thing seems a little silly . . . There never has been a controversy regarding the use of the two materials, in the minds of the well-informed. The soil scientist first called to our attention the crying need for the conservation of organic matter in our soils. The value of organics to gardening has been known and undisputed for years. Tests being made of thousands of soils each year indicate a woeful lack of the magical substance. So let us all join the 'organists' in their campaign for fuller appreciation, use, and conservation of that natural builder of the soil. But let us not forget that we have an ally in chemical fertilizer. It is a powerful tool which cannot be ignored." (*Tennessee Horticulture, November 1947*)

Sulphur Production Sets Record in 1947

The figures of the U. S. Bureau of Mines show that the production of sulphur in the United States during 1947 amounted to 4,441,214 tons, an increase of 15 per cent over the 1946 output of 3,859,642 tons. Production has increased each year for the past five years. Shipments during 1947 amounted to 4,828,103 tons, leaving stocks on hand at producers' plants of 3,371,034 tons at the end of the year.

CONSERVATION AND PUBLIC POLICY

(Continued from page 10)

conservation practices. We should clearly expand the numbers of such personnel.

The fourth and final type of activity includes the use of incentive payments *in so far as these are necessary to induce voluntary and rapid cooperation in the conservation program.* In determining the amount and nature of these payments, two things should be kept in mind:

1. Experience has shown that farmers in the long run, and even in the short run in most cases, benefit financially from the installation of conservation practices. Hence, it might seem that no incentive payments should be made for conservation.
2. But the public interest demands the establishment of conservation practices on the land in the shortest possible time. The conservation of soil and fertility is not a matter of choice, but of national necessity. If conservation is not achieved by voluntary means, coercion will be employed some day—and coercion, besides being abhorrent to us and inconsistent with our whole political philosophy, would cost us a great deal of money. Hence it is more preferable to employ incentive payments to help farmers change their traditional and wasteful practices.

I would insist that incentive payments be made exclusively on the basis of an individual farm plan which, when fully adopted, would yield maximum conservation through sound land use. Since any such plan can be carried out in five years, payments to an individual farmer should not exceed that period, and should be conditional upon his achieving a fifth of the total plan each year. I am completely persuaded that no payments should be made for the maintenance of conservation farming or specific conservation practices once a conservation program has been achieved, for, as I have said, in practically every case the extra income derived from conservation farming is more than sufficient to pay the cost of upkeep.

Incentive payments for conservation should be handled by the same public agency that provides technical guidance in conservation. The existence of two agencies in this field is wasteful, confusing, and foolish. But if, at some future time, payments within a price or income stabilization plan are made, they should under no circumstances be administered by the conservation agency.

The level of the incentive payments should be such that the public would bear about half of the total conservation cost, farmers of course bearing the other half.

Decentralize Administration

The time is fast approaching, I think, when such a program of physical soil conservation should be greatly decentralized. I have nothing but praise for the Soil Conservation Service and the pioneer work it has done. We would not have made the progress we have, had it not been for that Service, headed by a man of great vision and capacity. But there are two persuasive reasons for a system of decentralization in which the Federal government would make grants-in-aid to State agencies which, in turn, should apportion the money (except for research and limited over-all technical guidance) to local soil conservation districts. The first reason is that only in this way will we get the enthusiastic support of all technically trained men in this whole field. There are thousands of capable men in State experiment stations and extension services who, under the present system of administration, are not making the contribution they can and would like to make to the whole endeavor.

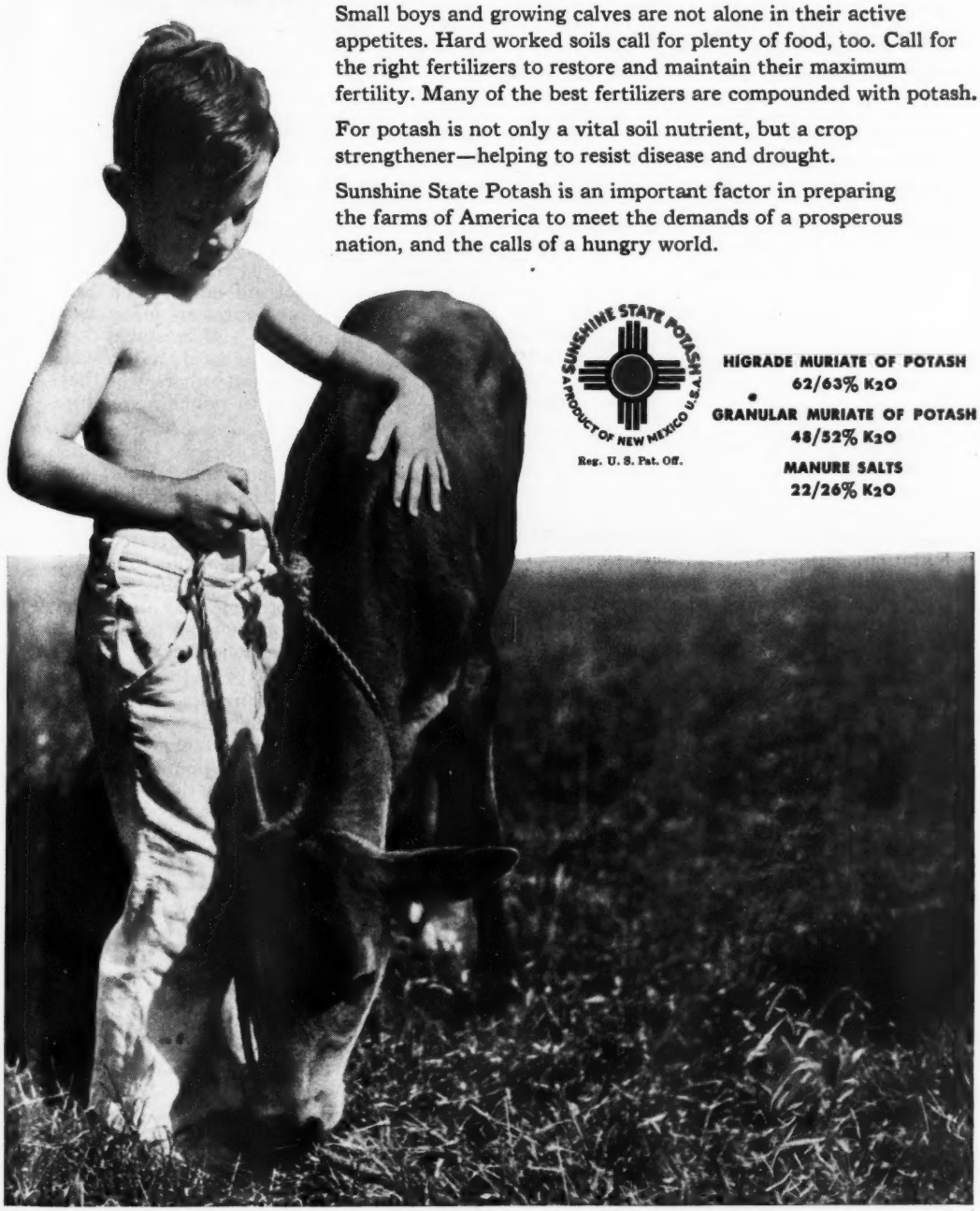
The second reason is more complex, and I haven't time to discuss it adequately. It has

SOILS GROW HUNGRY, TOO . . .

Small boys and growing calves are not alone in their active appetites. Hard worked soils call for plenty of food, too. Call for the right fertilizers to restore and maintain their maximum fertility. Many of the best fertilizers are compounded with potash.

For potash is not only a vital soil nutrient, but a crop strengthener—helping to resist disease and drought.

Sunshine State Potash is an important factor in preparing the farms of America to meet the demands of a prosperous nation, and the calls of a hungry world.



SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.

Reg. U. S. Pat. Off.

HIGRADE MURIATE OF POTASH
62/63% K_2O

GRANULAR MURIATE OF POTASH
48/52% K_2O

MANURE SALTS
22/26% K_2O

UNITED STATES POTASH COMPANY, *Incorporated*, 30 Rockefeller Plaza, New York 20, N. Y.

to do with a prime requirement of democracy—the need to decentralize public effort as much as possible and to give greater numbers of people the opportunity of accepting responsibility, for, as Justice Holmes so eloquently contended, every human being is capable of carrying responsibility if only we will make it possible for him to do so. And since national economic programs (whatever they may be) obviously must be centrally controlled and administered, it is clear to me that, wherever possible, other types of programs—such as those in the field I am discussing—should be decentralized. Only in this way can we maintain a reasonable balance and avoid the excessive decentralization that bothers a good many students of our American political system.

Link Payments with Progress

The second part of the domestic conservation policy I am suggesting may be briefly stated. Since the public will be investing money in conservation, it would be entirely appropriate, I think, for all other public aid in agriculture to be withheld from a farmer if he is not making proper progress in the adoption and maintenance of good land-use practices on his farm. I mean specifically that the benefits of farm credit, rural rehabilitation, water facilities, reclamation, and other publicly financed programs should be withheld from farmers who continue needlessly to waste resources that are important not only to them but to the nation.

To this domestic policy with regard to soil conservation, we would do well to add a foreign policy—for the problem of food and of maintaining soil resources, is a world problem toward the solution of which we can make a major contribution. Other nations are today studying our conservation program and are adapting portions of it to their own conditions. The soil conservation district idea is spreading to other lands—to Mexico, the Union of South Africa, and parts of Australia. The force of our example here might well be supplemented by positive international conservation effort through the United Nations and especially through the Food and Agriculture Organization. Such international effort, whereby the attention of different peoples is focused on this concrete physical problem, might do much to promote genuine international understanding. In short, here is an opportunity for agricultural America to make a significant contribution to world co-operation and thus to world peace.

In conclusion, I wish to say that it has not been my purpose to criticize any individual, group, or agency. I served for seventeen years in the United States Department of Agriculture, and I am now with a State institution which cooperates in many ways with that Department. If mistakes have been made in the past, I must share the blame with a hundred thousand others who have also been connected with public agricultural efforts.

I have spoken frankly because I know it is time for frank and honest talk. But I have not spoken thus with the thought that all of you will at once agree with the broad outlines of the program I have suggested. If I have set the wheels of your minds to turning, if I have stimulated you to think critically about a truly basic problem and about what this great nation of ours should do about it, I shall be completely satisfied.

The challenge to the world today is the attainment of human freedom and peace. Neither of these supreme goals can be reached among peoples who are hungry or half-starved. Every individual who puts his mind, his heart, and his hand to the problem of conservation and abundant production, is thereby personally making a contribution to freedom and to peace.

BUYERS' GUIDE • A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"

AMMONIA—Anhydrous and Liquor
Commercial Solvents Corp., New York City
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE
Lion Oil Co., El Dorado, Ark.
Spencer Chemical Co., Kansas Cy, Mo.

BAG MANUFACTURERS—Burlap
Bemis Bros. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Cotton
Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Paper
Bemis Bro. Bag Co., St. Louis, Mo.
Chase Bag Co., Chicago, Ill.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Hammond Bag & Paper Co., Welisburg, W. Va.
International Paper Co., Bagpak Div., New York City
Jaite Company, The, Jaite, Ohio
Raymond Bag Co., Middletown, Ohio
St. Regis Paper Co., New York City

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
Huber & Company, New York City
McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES
St. Regis Paper Co., New York City
Union Special Machine Co., Chicago, Ill.

BAG PRINTING MACHINES
Schmutz Mfg. Co., Louisville, Ky.

BAGGING MACHINES—For Filling Sacks
Atlanta Utility Works, The, East Point, Ga.
Exact Weight Scale Co., Columbus, Ohio
St. Regis Paper Co., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

BONE BLACK
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City

BONE PRODUCTS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
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Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City.
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—For Hoists, Cranes, etc.
Hayward Company, The, New York City

BUCKETS—Elevator
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARS AND CARTS
Atlanta Utility Works, The, East Point, Ga.
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind

CHEMICALS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Commercial Solvents Corp., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, I
Lion Oil Company, El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Spencer Chemical Co., Kansas City, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS
Jackle, Frank R., New York City.
Keim, Samuel D., Philadelphia, Pa.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
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Huber & Company, New York City
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City

DRYERS
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ENGINEERS—Chemical and Industrial
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FERTILIZER (Mixed) MANUFACTURERS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago,
Southern States Phosphate & Fertilizer Co., Savannah, Ga
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City.
McIver & Son Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

FOUNDERS AND MACHINISTS
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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

HOPPERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agricultural Chemical Co., New York City

LIMESTONE
American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Longview-Saginaw Lime Works, Inc., Birmingham, Ala.
McIver & Son, Alex. M., Charleston, S. C.

LOADERS—Car and Wagon
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Elevating and Conveying
Atlanta Utility Works, The, East Point, Ga.
Hough Co., The Frank G., Libertyville, Ill.
Hayward Company, The, New York City
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Pulverizing Machinery Co., Summit, N. J.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Hayward Company, The, New York City
Hough Co., The Frank G., Libertyville, Ill.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Power Transmission
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MANGANESE SULPHATE
McIver & Son, Alex. M., Charleston, S. C.

MINOR ELEMENTS
Agricultural Minerals Co., Montgomery, Ala.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

NITRATE OF SODA
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Il.
McIver & Son, Alex. M., Charleston, S. C.

NITROGEN SOLUTIONS
Lion Oil Company, El Dorado, Ark.
Spencer Chemical Co., Kansas City, Mo.

NITROGENOUS ORGANIC MATERIAL
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J. New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.

PHOSPHATE ROCK
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.

PLANT CONSTRUCTION—Fertilizer and Acid
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Titlestad Corporation, Nicolay, New York City

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City.

POTASH SALTS—Manufacturers
American Potash and Chem. Corp., New York City
Potash Co. of America, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
United States Potash Co., New York City

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYRITES—Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.

REPAIR PARTS AND CASTINGS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

BUYERS' GUIDE

SCALES—Including Automatic Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SCREENS
Atlanta Utility Works, The, East Point, Ga.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

SEPARATORS—Air
Kent Mill Co., Brooklyn, N. Y.
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Co., Boston, Mass.

SPRAYS—Acid Chambers
Monarch Mfg. Works, Inc., Philadelphia, Pa.

SULPHATE OF AMMONIA
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULPHUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City

SULPHURIC ACID
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicaro, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

TAGS
Keener Mfg. Co., Lancaster, Pa.

TANKAGE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

Alphabetical List of Advertisers

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